

Claims

1. A post-construction anchor comprising a sleeve having an expansion part and a plug formed with a tapered part inserted into the sleeve for
5 expanding the expansion part, the anchor being adapted to an undercut-type prepared hole having near a bottom thereof a diameter expanded in a taper way, characterized in that

when the plug is hammered with the sleeve contacting the bottom of the prepared hole, an inner peripheral surface of the expansion part is
10 engaged with an outer peripheral surface of the plug in a concavo-convex way as the expansion part expands until the expansion part makes close contact with the tapered surface of the prepared hole in accordance with relative displacement between the expansion part and the plug, and

that, at the same time, by a hole-bottom reaction force generated by
15 the plug contacting the bottom of the prepared hole, a construction is completed with the expansion part making press contact with the tapered surface of the prepared hole.

2. The post-construction anchor as claimed in claim 1, characterized in
20 that an annular engagement groove is formed in the inner peripheral surface of the expansion part, and an annular projecting part is formed on the outer peripheral surface of the plug, and

that the engagement groove is engaged with the annular projecting part in a concavo-convex way when the expansion part expands to contact the
25 tapered surface of the prepared hole in accordance with the relative displacement between the expansion part and the plug.

3. The post-construction anchor as claimed in claim 1 or 2, characterized in that, with the expansion part being unexpanded, a flange part at a distal
30 end of the plug is locked at an inner periphery opening edge at a distal end of

the sleeve for preventing disengagement of the sleeve from the plug.

4. The post-construction anchor as claimed in claim 3, characterized in that, with the expansion part being unexpanded, the outer peripheral surface of the plug is engaged with the inner peripheral surface of the sleeve in a concavo-convex way for preventing disengagement of the plug from the sleeve, and as a consequence, the flange part at the distal end of the plug is locked at an inner periphery opening edge at the distal end of the sleeve for preventing disengagement of the sleeve from the plug.

5. The post-construction anchor as claimed in any one of claims 1 to 4, characterized in that the prepared hole is formed with a straight hole part having a diameter smaller than that of a prepared hole general part, the straight hole part being continuously formed with a bottom of a tapered hole part having a diameter expanded in a taper way, and

that the unexpanded expansion part contacts the bottom of the tapered hole part prior to expansion of the expansion part, whereas the distal end of the plug contacts a bottom of the straight hole part upon completion of the construction.

6. The post-construction anchor as claimed in claim 5, characterized in that the plug is formed in a stepped shank, and

that the unexpanded sleeve is inserted into and supported in a small-diameter shank part to thereby set an outer diameter of a general part of the plug and that of a general part of the unexpanded sleeve at roughly the same dimension.

7. The post-construction anchor as claimed in any one of claims 1 to 6, characterized in that the plug is formed with a female thread part.

8. The post-construction anchor as claimed in any one of claims 1 to 6, characterized in that the plug includes a deformed bar for reinforced concrete.

9. The post-construction anchor as claimed in any one of claims 1 to 7,
5 characterized in that helical grooves of thread groove shape are formed in the outer peripheral surface of the plug.

10. The post-construction anchor as claimed in any one of claims 1 to 9,
10 characterized in that the plug is formed with a restraint ring which can receive a part of the sleeve, and

that, at the final stage of expanding the expansion part, an end of the restraint ring abuts on the outer peripheral surface of the expansion part to restrain an expanded bend part.

11. The post-construction anchor as claimed in claim 10, characterized in
15 that a groove engaged with the end of the restraint ring is formed in the outer peripheral surface of the expansion part.

12. The post-construction anchor as claimed in claim 10 or 11,
20 characterized in that the restraint ring is fixed to the plug beforehand by press-fit or welding.

13. The post-construction anchor as claimed in claim 2 or 3, characterized
25 in that the annular projecting part of the outer peripheral surface of the plug at a part near the top includes a cylindrical straight part, and

that when the expansion part expands to contact the tapered surface of the prepared hole, a part of the engagement groove makes close contact with a part of the straight part.

30 14. The post-construction anchor as claimed in claim 13, characterized in

that the prepared hole is formed with a straight hole part having a diameter smaller than that of a prepared hole general part, the straight hole part being continuously formed with a bottom of the tapered hole part having a diameter expanded in a taper way, and

5 that the unexpanded expansion part contacts the bottom of the tapered hole part prior to expansion of the expansion part, whereas the distal end of the plug contacts a bottom of the straight hole part upon completion of the construction.

10 15. The post-construction anchor as claimed in claim 14, characterized in that the expansion part has an expanding claw and an auxiliary expanding claw on the root side of the expanding claw, and

 that, in parallel with the expanding claw part making press contact with the tapered surface of the tapered hole part, the auxiliary expanding claw is
15 plastically deformed and engaged in an inner peripheral surface of the prepared hole general part upon completion of the construction.

16. The post-construction anchor as claimed in claim 15, characterized in that the construction is completed with a distal end surface of the expansion
20 part makes press contact with the bottom of the tapered hole part.

17. The post-construction anchor as claimed in claim 16, characterized in that, during a period from when the unexpanded expansion part sequentially expands and contacts the bottom of the tapered hole part to completion of the
25 construction, the distal end surface of the expansion part makes always press contact with the bottom of the tapered hole part.

18. A drill bit for drilling an undercut-type prepared hole prior to the construction of a post-construction anchor adapted to the prepared hole, the
30 prepared hole having near a bottom thereof a tapered hole part having a

diameter expanded in a taper way and a straight hole part having a diameter smaller than that of a prepared hole general part, the straight hole part being continuously formed with a bottom of the tapered hole part, characterized in that

5 a small-diameter blade part is provided to a cutter body at a distal end thereof for drilling the straight hole, and a large-diameter blade part is provided to the cutter body on the side opposite to the small-diameter blade part for drilling the prepared hole general part, the large-diameter blade part being swingable and retractable radially,

10 that, in a process of drilling the prepared hole, the small-diameter blade part first drills the straight hole part, and then the large-diameter blade part in the unexpanded diameter state drills the prepared hole general part in such a way as to expand the diameter of the straight hole part, and

15 that, when a depth of the prepared hole reaches a predetermined depth, the large-diameter blade part protrudes swingably radially to thereby expand the diameter of the large-diameter blade part, expanding the diameter of a part of the prepared hole general part close to the straight hole part in a taper way, thus working the tapered hole part.

20 19. The drill bit for working the prepared hole as claimed in claim 18, characterized in that the small-diameter blade part includes a straight hole cutter blade, and the large-diameter blade part includes an undercutting cutter blade, and

25 that an operating rod inserted into the cutter body concentrically therewith is engaged with the undercutting cutter blade, and the undercutting cutter blade has a diameter expanded in accordance with slide displacement of the operating rod.